



IMS Learning Resource Meta-data Information Model

Version 1.2 Final Specification

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Document Name: IMS Learning Resource Meta-data Information Model
Revision: 17 May 2001

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1. Introduction

This document describes the names, definitions, organization, and constraints of the IMS meta-data elements. This work is composed of two parts, a working document from an IEEE standards committee, of which IMS member organizations have been key contributors, and a number of modifications that have been approved by the IMS Technical Board.

The IEEE document is the Working Draft 6.1 Learning Object Meta-data (LOM) Scheme working document of the IEEE Learning Technology Standards Committee's (LTSC) LOM Working Group. Many organizations around the world have collaborated on this document, including substantial involvement by IMS member organizations either directly or through IMS Briefing and Feedback meetings. The document lists the meta-data elements and how they are organized hierarchically. Each element is described with 5 pieces of information:

Name:	How the meta-data element should be spelled.
Explanation:	The definition of the element.
Multiplicity:	How many elements are allowed and whether their order is significant.
Domain:	What the element's vocabulary is limited to and other information.
Type:	Whether the element's value is textual, numerical or a date; and any constraints on its size and format.
Extensible:	Whether the element is extensible or not.
Note:	Why the element was included, guidelines for its use, etc.
Example:	Sample use of element, where appropriate.

The second part of this document contains a number of modifications approved unanimously by the IMS Technical Board. These changes were recommended based on implementation testing and detailed document reviews. The IMS Technical Board representatives include many individuals who have actively participated in the development of the IEEE document. Those individuals judged the likelihood of these changes being incorporated into the IEEE document as high.

Any future IMS certification/conformance testing will be based on the combination of these two resources.

2. IEEE Document

LOM Working Draft 6.1 posted 13 February 2001 (included <http://ltsc.ieee.org/doc/wg12/> below for reference).

IMS additions and modifications are noted in the Modifications section following the IEEE LTSC LOM Working Draft 6.1 tables.

2.1 IMS Meta-data Information Model

The following table is based on the IEEE LTSC LOM Working Draft 6.1: Base Scheme (2001-02-13). Names have been changed to be all lower case.

Nr	Name	Explanation	Multiplicity	Domain	Type	Extensible	Note	Example
BaseScheme								
1	general	Groups information describing learning object as a whole.	single instance	-	-	Yes	-	-
1.1	identifier	Globally unique label for learning object.	single value	-	String	No	1. This element can be transparent to the meta-data creator. It can be created by the meta-data management system. 2. This element corresponds with the Dublin Core element DC.Identifier. 3. You can use your own ID method or the IMS best practice.	-
1.2	title	Learning object's name.	single value	-	LangStringType (1000 char)	No	1. The title can be an already existing one or it may be created by the indexer ad hoc. 2. Corresponds with Dublin Core element DC.Title.	-

1.3	catalogentry	Designation given to resource.	unordered list; smallest permitted max: 10 items	-	-	Yes	One of the catalog entries can be generated automatically by the tool.	-
1.3.1	catalog	Source of following string value.	single value	-	String (1000 char)	No	Generally the name of the catalog.	ISBN, ARIADNE
1.3.2	entry	Actual value.	single value	-	LangStringType (1000 char)	No	Generally the number in the catalog named in <i>Catalog</i> (1.3.1).	2-7342-0318, LEO875
1.4	language	Learning object's language (can be Language without Country subcode; implies intended language of target audience). "None" is also acceptable.	unordered list, smallest permitted maximum: 10 items; ISO 639-ISO 3166, see also xml:lang (RFC1766)	LanguageID = Langcode('-Subcode)*, with Langcode a two-letter language code as defined by ISO639 and Subcode a country code from ISO3166.	String (100 char)	No	1. The approach adopted is compatible with that of the xml:lang attribute and is defined by RFC1766. 2. ISO639 deals with 'ancient' languages, like Greek and Latin. 3. Tool should provide useful default. 4. It is customary to give the language code in lower case and the country code (if any) in upper case. However, the values are case insensitive. 5. This element corresponds with the Dublin Core element DC.Language.	"en", "en-GB", "de", "fr-CA", "it"
1.5	description	Describes learning object's content.	unordered list, smallest permitted maximum: 10 items	-	LangStringType (2000 char)	No	This element corresponds to the Dublin Core element DC.Description.	-

1.6	keyword	Contains keyword description of the resource.	unordered list, smallest permitted maximum: 10 items	-	LangStringType (1000 char)	No	It is <i>strongly</i> recommended not to use this element for characteristics that can be described by other elements.	-
1.7	coverage	Temporal / spatial characteristics of content (e.g., historical context).	unordered list, smallest permitted maximum: 10 items	-	LangStringType (1000 char)	No	This element corresponds with the Dublin Core element DC.Coverage.	-
1.8	structure	Underlying organizational structure of the resource.	single value	vocabulary: {Collection, Mixed, Linear, Hierarchical, Networked, Branched, Parceled, Atomic}	Vocabulary	No	-	-
1.9	aggregationlevel	The functional size of the resource.	single value	restricted range: 1 - 4	Vocabulary	No	Level 1 means smallest level of aggregation, e.g. raw media data or fragments. Level 2 refers to a collection of atoms, e.g. an HTML document with some embedded pictures or a lesson. Level 3 indicates a collection of level 1 resources, e.g. a 'web' of HTML documents, with an index page that links the pages together or a unit. Finally, level 4 refers to the largest level of granularity, e.g. a course.	-
2	lifecycle	History and current state of resource.	single instance	-	-	Yes	-	-

2.1	version	The edition of the learning object.	single value	-	LangStringType (50 char)	No	-	3.0, 1.2.alpha, voorlopige versie
2.2	status	Learning object's editorial condition.	single value	vocabulary: {Draft, Final, Revised, Unavailable}	Vocabulary	No	-	-
2.3	contribute	Persons or organizations contributing to the resource (includes creation, edits, and publication).	unordered list; smallest permitted maximum items: 30	-	-	Yes	-	-
2.3.1	role	Kind of contribution.	single value	vocabulary: {Author, Publisher, Unknown, Initiator, Terminator, Validator, Editor, Graphical Designer, Technical Implementer, Content Provider, Technical Validator, Educational Validator, Script Writer, Instructional Designer}	Vocabulary	No	It is recommended that exactly one instance of Author exists.	-

2.3.2	entity	Entity or entities involved, most relevant first.	ordered list; smallest permitted maximum items: 40; vCard	vCard <http://www.imc.org/pdi/>	String (1000 chars)	No	1. If <i>Role</i> (2.3.1) is Author, then the entity is typically a person and this element corresponds with the Dublin Core element DC.Creator. 2. If <i>Role</i> equals Publisher, then the entity is typically an organization and this element corresponds with the Dublin Core element DC.Publisher. 3. If <i>Role</i> is not equal to Author or Publisher, then this element corresponds with the Dublin Core element DC.Contributor. 4. If the entity is an organization, then it is typically a university department, company, agency, institute, etc. under whose responsibility the contribution was made.	-
2.3.3	date	Date of contribution.	single value	-	DateType	No	-	-
3	metametadata	Features of the description rather than the resource.	single instance	-	-	Yes	-	-
3.1	identifier	A unique label for the meta-data.	single value	-	String	No	This element can be transparent to the meta-data creator. It can be created by the meta-data management system. You can use your own ID method or the IMS best practice	-
3.2	catalogentry	Designation given to the meta-data instance.	unordered list, smallest permitted maximum: 10 items	-	-	Yes	One of the catalog entries can be generated automatically by the tool.	-

3.2.1	catalog	Source of following string value.	single value	-	String (1000 char)	No	Generally system generated.	Ariadne
3.2.2	entry	Actual string value.	single value	-	LangStringType (1000 char)	No	Generally system generated.	KUL532
3.3	contribute	Persons or organizations contributing to the meta-data.	ordered list, smallest permitted maximum: 10 items	-	-	Yes	-	-
3.3.1	role	Kind of contribution.	single value	vocabulary: {Creator, Validator}	Vocabulary	No	It is recommended that exactly one instance of creator exists.	-
3.3.2	entity	Entity or entities involved, most relevant first.	ordered list as vCard; smallest permitted maximum: 10 items	vCard <http://www.imc.org/pdi/>	String (1000 char)	No	-	-
3.3.3	date	Date of contribution.	single value	-	DateType	No	-	-
3.4	metadatascheme	Names the structure of the meta-data (this includes version).	unordered list; smallest permitted maximum: 10 items	-	String (30 char)	No	1. Generally user selectable or system generated. 2. If multiple values are provided, then the meta-data instance conforms to multiple meta-data schemes.	LOMv1.0
3.5	language	Language of the meta-data instance. This is the default language for all LangString values.	single value	See general.language	String (100 char)	No	“none” is an acceptable value.	-
4	technical	Technical features of the learning object.	single instance	-	-	Yes	-	-

4.1	format	Technical data type of the resource.	unordered list, smallest permitted maximum: 40 items	restricted: MIME type or 'non-digital'	String (500 char)	No	1. Can be used to identify the software needed to access the resource. 2. This element corresponds with the Dublin Core element DC.Format.	video/ mpeg, application/ x-toolbook, text/ html
4.2	size	The size of the digital resource in bytes. Only the digits '0' - '9' should be used; the unit is bytes, not MBytes, GB, etc.	single value	-	String (30 char)	No	This refers to the actual size of the resource, and not to the size of a compressed version of the resource.	-
4.3	location	A location or a method that resolves to a location of the resource. Preferable Location first.	ordered list; smallest permitted maximum: 10 items	-	String (1000 char)	No	-	http://host/ id
4.4	requirement	Needs in order to access the resource. If there are multiple requirements, then the logical connector is AND.	multiple unordered instances; smallest permitted maximum: 10 items	-	-	Yes	-	-
4.4.1	type	Type of requirement.	single value	vocabulary: {Operating System, Browser}	Vocabulary	No	-	-

4.4.2	name	Name of the required item.	single value	if Type='Operating System', then vocabulary: {PC-DOS, MS-Windows, MacOS, Unix, Multi-OS, Other, None} if Type='Browser' then vocabulary: {Any, Netscape Communicator, Microsoft Internet Explorer, Opera} if other type, then open vocabulary	Vocabulary	No	May be derived from <i>Format</i> (4.1) automatically, e.g., HTML implies "Multi-OS"	-
4.4.3	minimumversion	Lowest version of the required item.	single value	-	String (30 char)	No	-	-
4.4.4	maximumversion	Highest version of the required item.	single value	-	String (30 char)	No	-	-
4.5	installationremarks	Description on how to install the resource.	single value	-	LangStringType (1000 char)	No	-	-
4.6	otherplatformrequirements	Information about other software and hardware requirements.	single value	-	LangStringType (1000 char)	No	-	sound card ..., runtime ...
4.7	duration	Time a continuous learning object takes when played at intended speed, in seconds.	single value	ISO8601	DateType	No	This is especially useful for sounds, movies, or animations.	01:30:00, 00:01:45
5	educational	Educational or pedagogic features of the learning object.	single instance	-	-	Yes	-	-

5.1	interactivitytype	The type of interactivity supported by the learning object.	single value	vocabulary: {Active, Expositive, Mixed, Undefined}	Vocabulary	No	In an <i>expositive</i> resource, the information flows mainly from the resource to the learner. Expositive documents are typically used for learning- by-reading. In an <i>active</i> learning object, information also flows from the learner to the resource. Active documents are typically used for learning- by- doing. note: Activating links to navigate in hypertext documents is not considered as an information flow. Thus, hypertext documents are expositive.	Expositive documents include essays, video clips, all kinds of graphical material and hypertext documents. Active documents include simulations, questionnaires and exercises.
5.2	learningresource type	Specific kind of resource, most dominant kind first.	ordered list; smallest permitted maximum: 10 items	vocabulary: {Exercise, Simulation, Questionnaire, Diagram, Figure, Graph, Index, Slide, Table, Narrative Text, Exam, Experiment, ProblemStatement, SelfAssesment}	Vocabulary	No	This element corresponds with the Dublin Core element 'Resource Type'. The vocabulary is adapted for the specific purpose of <i>learning</i> objects.	-
5.3	interactivitylevel	Level of interactivity between an end user and the learning object.	-	vocabulary: {very low, low, medium, high, very high}	Vocabulary	No	-	-
5.4	semanticdensity	Subjective measure of the learning object's usefulness as compared to its size or duration.	-	vocabulary: {very low, low, medium, high, very high}	Vocabulary	No	-	-

5.5	intendedenduserrole	Normal user of the learning object, most dominant first.	ordered list, smallest permitted maximum: 10 items	vocabulary: {Teacher, Author, Learner, Manager}	Vocabulary	No	A learner works with a resource in order to learn something. An author creates or publishes a resource. A manager manages the delivery of the resource, e.g., a university or college. The document for a manager is typically a curriculum.	-
5.6	context	The typical learning environment where use of learning object is intended to take place.	unordered list; smallest permitted maximum: 10 items;	vocabulary: {Primary Education, Secondary Education, Higher Education, University First Cycle, University Second Cycle, University Postgrade, Technical School First Cycle, Technical School Second Cycle, Professional Formation, Continuous Formation, Vocational Training}	Vocabulary	No	-	-
5.7	typicalagerange	Age of the typical intended user.	unordered list; smallest permitted maximum: 5 items	-	LangStringType (1000 chars)	No	-	suitable for children over 7, adults only
5.8	difficulty	How hard it is to work through the learning object for the typical target audience.	single value	vocabulary: {very easy, easy, medium, difficult, very difficult}	Vocabulary	No	-	-
5.9	typicallearningtime	Approximate or typical time it takes to work with the resource.	single value	ISO8601	DateType	No	-	01:30:00, 00:01:45

5.10	description	Comments on how the learning object is to be used.	single value	-	LangStringType (1000 char)	No	-	A teacher's guidelines.
5.11	language	User's natural language.	single value	-	String (100 char)	No	See general.language.	-
6	rights	Conditions of use of the resource.	single instance	-	-	Yes	Intent is to reuse results of ongoing work in the Intellectual Property Right and e-commerce communities. This category currently provides the absolute minimum level of detail only.	-
6.1	cost	Whether use of the resource requires payment.	single value	vocabulary: {yes, no}	Vocabulary	No	-	-
6.2	copyrightandotherrestrictions	Whether copyright or other restrictions apply.	single instance	vocabulary: {yes, no}	Vocabulary	No	-	-
6.3	description	Comments on the conditions of use of the resource.	single value	-	LangStringType (1000 char)	No	-	-
7	relation	Features of the resource in relationship to other learning objects.	unordered list; smallest permitted maximum: 100 items	-	-	Yes	-	-
7.1	kind	Nature of the relationship between the resource being described and the one identified by <i>Resource</i> (7.2).	single value	vocabulary list from Dublin Core: {IsPartOf, HasPart, IsVersionOf, HasVersion, IsFormatOf, HasFormat, References, IsReferencedBy, IsBasedOn, IsBasisFor, Requires, IsRequiredBy}	Vocabulary	No	This element corresponds with the Dublin Core element DC.Relation.	-

7.2	resource	Resource the relationship holds for.	single instance	-	-	Yes	-	-
7.2.1	identifier	Unique Identifier of the other resource.	single value	-	String	No	-	-
7.2.2	description	Description of the other resource.	single value	-	LangStringType (1000 char)	No	-	-
7.2.3	catalogentry	Description of the other resource.	unordered list; smallest permitted maximum: 10 items	-	-	Yes	See general.catalogentry.	-
8	annotation	Comments on the educational use of the learning object.	unordered list; smallest permitted maximum: 30 items	-	-	Yes	-	-
8.1	person	Annotator.	single value	vCard < http://www.imc.org/pdi/ >	String (1000 char)	No	-	-
8.2	date	Date that the annotation was created.	single value	-	DateTime	No	-	-
8.3	description	The content of the annotation.	single value	-	LangStringType (1000 char)	No	-	-
9	classification	Description of a characteristic of the resource by entries in classifications.	unordered list; smallest permitted maximum: 40 items	-	-	Yes	1. End users can refer to their preferred classifications. 2. If <i>Purpose</i> (9.1) equals Discipline, then this category corresponds with the Dublin Core element DC.Subject.	-

9.1	purpose	Characteristics of the resource described by this classification entry.	single value	vocabulary: {Discipline, Idea, Prerequisite, Educational Objective, Accessibility Restrictions, Educational Level, Skill Level, Security Level}	Vocabulary	No	-	-
9.2	taxonpath	A taxonomic path in a specific classification.	unordered instance; smallest permitted maximum: 15 items	-	-	No	There may be different paths, in the same or different classifications, that describe the same characteristic.	-
9.2.1	source	A specific classification.	single value	-	LangStringType (1000 char)	No	Any recognized "official" taxonomy, any user-defined taxonomy. A tool may provide the top-level entries of a well-established classification (LOC, UDC, DDC, etc.).	ACM, MESH, ARIADNE
9.2.2	taxon	An entry in a classification. An ordered list of Taxons creates a taxonomic path, i.e. "taxonomic stairway": this is a path from a more general to more specific entry in a classification.	ordered list; smallest permitted maximum: 15 items	-	-	No	A TaxonPath can have a depth from 1 to 9. Normal values are between 2 and 4.	Physics/ Acoustics/ Instruments/ Stethoscope Medicine/ Diagnostics/ Instruments/ Stethoscope
9.2.2.1	id	Taxon's identifier in taxonomic system	single value	-	String (100 char)	No	Repertoire of ISO/IEC 10646-1	-
9.2.2.2	entry	Taxon's name or label (other than identifier)	single value	-	LangStringType (500 char)	No	-	-

9.3	description	A textual description of learning object relative to its stated purpose.	single value	-	LangStringType (2000 char)	No	-	-
9.4	keyword	Contains keyword description of learning objective relative to its stated purpose.	ordered list smallest permitted maximum: 40 items	-	LangStringType (1000 char)	No	-	-

Nr	Name	Explanation	Multiplicity	Domain	Type	Extensible	Note	Example
LangStringType								
1	langstring	String in one or more human languages.	unordered list; smallest permitted maximum: 10 items	-	-	No	-	-
1.1	language	Human language in which the string is expressed.	single value	LanguageID = Langcode('-Subcode)*, with Langcode a two-letter language code as defined by ISO639 and Subcode a country code from ISO3166.	String (100 char)	No	1. The approach adopted is compatible with that of the xml:lang attribute and is defined by RFC1766. 2. ISO639 deals with 'ancient' languages, like Greek and Latin. 3. Tool should provide useful default. 4. It is customary to give the language code in lower case and the country code (if any) in upper case. However, the values are case insensitive. 5. If no Language is specified, then LangString. String should be interpreted as a string in MetaMetaData. Language.	"en", "en-GB", "de", "fr-CA", "it"
1.2	string	Actual string value.	single value	-	String	No	-	-

Nr	Name	Explanation	Multiplicity	Domain	Type	Extensible	Note	Example
DateType								
1	datetime	Date expressed as per ISO8601 standard.	single value	ISO8601	String (200 char)	No	Corresponds with the Dublin Core element DC.Date.	1999-06-11
2	description	Description of the date.	single value	-	LangString (1000 char)	No	-	circa 1300 BC, Fall 1999

Nr	Name	Explanation	Multiplicity	Domain	Type	Extensible	Note	Example
Vocabulary								
1	source	Source of vocabulary item(s).	single value	-	LangString (1000 char)	No	-	-
2	value	Actual descriptor.	single value	-	LangString (1000 char)	No	If source is "LOMv1.0" then value is from base description.	-

2.2 IMS Modifications

The changes, with some rationale, are provided below with the specific changes to the IEEE document in wording shown in *italics* text:

Nr	Name	Explanation	Multiplicity	Type	Rationale
1.6	keyword	Contains keyword description of the resource.	unordered list (10 items)	LangString Type (1000 char)	This element was renamed to <keyword> to more closely represent a semantically equivalent container for translations of the same keyword or phrases in various languages.
4.4	requirement	Needs in order to access the resource	multiple unordered instances (10 items)	-	This element was renamed to <requirement> to more closely represent a semantically equivalent container for different translations of the same requirement.
9.4	keyword	Contains keyword description of the resource.	unordered list (10 items)	LangString Type (1000 char)	This element was renamed to <keyword> to more closely represent a semantically equivalent container for translations of the same keyword or phrases in various languages.

2.3 Extensions

The IEEE LOM Draft Standard may not adequately capture all meta-data needed to describe learning objects and their use. The LOM allows extensions for proprietary meta-data elements and structures. The LOM states: “Extension data elements shall not replace data elements in the LOM structure. NOTE--All data elements in the metadata instance should describe characteristics as defined by this standard. (For example, the user shall not abuse the title data element to describe the fonts used in the document.) Abusing data elements would compromise semantic interoperability.”

The decision to implement extensions to the LOM should not be taken lightly, because using extensions risks breaking interoperability. The IMS Learning Resource Meta-data XML Binding Specification defines two ways for treating all user-defined, proprietary extensions in a uniform manner. Consensus on the specific use of extensions is highly desirable. Any uses or proposed uses of extensions should be brought to the attention of the IMS Meta-data Working Group (md-question@imsglobal.org).

2.3.1 Extensions Using DTDs

IMS defines the element called <extension> for use when building extensions using a DTD control file. This element is optional for every branch of the meta-data tree structure. See the IMS Meta-data DTD http://www.imsglobal.org/xml/imsmd_rootv1p2.dtd.

Using extensions with more than one DTD control file is problematic. IMS recommends using XML Schema Definition language and its namespacing capability when using extensions.

2.3.2 Extensions Using XML Schema Definitions

IMS supports extensible meta-data using the XML Schema Definition language (XSD, XDR) through the use of other LOM elements as an extension or as new elements (defined in a specific namespace). Namespace elements typically contain a meaningful prefix, such as “adl” (to represent the Advanced Distributed Learning initiative) to uniquely identify its extensions. IMS recommends the use of the W3C Recommendation for **Namespaces** (<http://www.w3.org/TR/1999/REC-xml-names-19990114>). See the IMS Meta-data Schema Definition files at <http://www.imsglobal.org/metadata>.

Appendix A - List of Contributors

The following individuals contributed to the development of this specification:

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About This Document

Title	IMS Learning Resource Meta-data Information Model
Authors	Thor Anderson and Mark McKell
Version	1.2
Version Date	May 2001
Status	Final Specification
Summary	This document provides updated information regarding IMS Learning Resource Meta-data Information Model.
Revision Information	17 May 2001
Purpose	Defines the IMS Learning Resource Meta-data Information Model
Document Location	http://www.imsglobal.org/metadata/imsmdv1p2/imsmd_infov1p2.html

Revision History

Version No.	Release Date	Comments
Final 1.0	20 August 1999	The version 1.0 of the IMS Learning Resource Meta-data Information Model released.
Final 1.1	5 May 2000	IEEE LTSC LOM Version 3.5 Tables included. All element names changed to lower case only.
Public Draft 1.2	20 April 2001	a) Updated IEEE LTSC LOM elements tables to latest version of LOM Working Draft 6.1. b) Changed root element from <record> to <lom>. c) Assigned “x-none” value to the xml:lang attribute when used within <source> and <value>.
Final 1.2	17 May 2001	a) Deprecated the <vocabulary> element. b) Renamed <keywords> and <requirements> to <keyword> and <requirement>, respectively. c) Added “ANY” function to allow extensibility on terminal node elements or those that don’t already allow sufficient extensibility through the LOM data type.

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It is your sole responsibility to evaluate the usefulness, accuracy, and completeness of the Specification as it relates to you.

IMS would appreciate receiving your comments and suggestions.

Please contact IMS through our website at <http://www.imsglobal.org>

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